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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,531	10/03/2003	Jeong-Hoon Ahn	9898-270	1358
7590 04/28/2005				
MARGER JOHNSON & McCOLLOM, P.C.				
1030 S.W. Morrison Street				
Portland, OR 97205				
		EXAMINER		
		ECKERT II, GEORGE C		
		ART UNIT		
		PAPER NUMBER		
		2815		

DATE MAILED: 04/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

11A

**Office Action Summary**

Application No.

10/678,531

Applicant(s)

AHN ET AL.

Examiner

George C. Eckert II

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 5-17, 19-22, 24-28 and 52 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-11, 13-17, 19, 20, 24-28 and 52 is/are rejected.
- 7) ☒ Claim(s) 12, 21 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment filed March 7, 2005 in which claims 1, 8 and 20 were amended, claims 4, 18 and 23 canceled and claim 52 newly added has been entered.

### ***Claim Objections***

2. The objection to claim 8 is overcome by applicant's amendment.
3. Claims 5, 19 and 24 are objected to because of the following informalities: claim 5 depends from claim 4 but claim 4 has been canceled, claim 19 depends from claim 18 but claim 18 has been canceled and claim 24 depends from claim 23 but claim 23 has been canceled. Claim 5 will be treated herein as depending from claim 1, claim 19 as depending from claim 8 and claim 24 as depending from 20. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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4. Claims 1, 2, 6, 7 and 52 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,184,567 to Fujisawa et al. (of record, hereinafter "Fujisawa"). Regarding claim 1, Fujisawa teaches in figures 8 and 16, a capacitor 10 formed on a substrate 43 comprising;

a first electrode 22 of a first metal layer (col. 3, line 34);

a second electrode 18 of a second metal layer (col. 3, line 27) that is closer to the substrate 102 than the first metal layer;

a dielectric material 20 between the first and second electrodes; and

a wire 32 coupled to a bottom surface of the first electrode,

wherein the first electrode is coupled to the wire through a contact hole in the dielectric material 20 (as seen in figure 8, a contact hole is formed in dielectric 20 so that electrical contact is made between wire 32 and electrode 22).

Regarding claim 2, Fujisawa teaches that the wire 32 is formed of a third metal layer closer to the substrate 43 than the second metal layer 18. Regarding claim 6, the wire 32 has a planarized top surface insofar as it is planar against the bottom of layer 12. The limitation of claim 7 is a processing limitation that is not afforded structural weight.

Regarding claim 52, the wire 32 of Fujisawa may be considered formed in a first metal layer, the bottom electrode 18 in a second layer and the top electrode 22 in a third layer such that the top electrode 22 couples to the contacting line 32 through a contact hole in the dielectric.

5. Claims 1, 3, 6, 7 and 52 are rejected under 35 U.S.C. 102(e) as being anticipated by 6,881,996 to Chen et al. (hereinafter "Chen"). Chen teaches in figures 2 and 13 a capacitor formed on a substrate 10, the capacitor comprising:

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a first electrode 26A of a first metal layer 26 (fig. 9);  
a second electrode 14A of a second metal layer 14 (fig. 3) that is closer to the substrate 10 than the first metal layer;  
a dielectric material 18 between the first and second electrodes; and  
a wire 14C coupled to a bottom surface of the first electrode,  
wherein the first electrode is coupled to the wire through a contact hole 5 in the dielectric material 18 (fig. 8).

Regarding claim 3, Chen teaches the wire 14c is formed of the second metal layer 14.  
Regarding claim 6, the wire 14C has a planar top surface as shown in figure 3 (see col. 5, lines 37-39). The limitation of claim 7 is a processing limitation that is not afforded structural weight.

Regarding claim 52, the wire 14C of Chen may be considered formed in a first metal layer, the bottom electrode 14A in a second layer and the top electrode 26A in a third layer such that the top electrode 26A couples to the contacting line 14C through a contact hole 5 in the dielectric.

6. Claims 1, 2, 6-9, 11, 13-19 are rejected under 35 U.S.C. 102(e) as being anticipated by 6,784,478 to Merchant et al. (of record, hereinafter "Merchant"). Merchant teaches in figure 1 a capacitor formed on a substrate 6, the capacitor comprising:

a first electrode 34 of a first metal layer;  
a second electrode 30 of a second metal layer that is closer to the substrate 6 than the first metal layer;  
a dielectric material 32 between the first and second electrodes; and

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a wire 22 coupled to a bottom surface of the first electrode,  
wherein the first electrode 34 is coupled to the wire 22 through a contact hole in the dielectric material 32 (fig. 1).

Regarding claim 2, Merchant teaches that the wire 22 is formed of a third metal layer that is closer to the substrate than the second metal layer 30. Regarding claim 6, Merchant teaches that the wire 22 has a planar top surface 19. The limitation of claim 7 is a processing limitation that is not afforded structural weight; however Merchant also teaches the wire formed by a damascene process (col. 3, lines 52-56).

Regarding claim 8, Merchant teaches a capacitor comprising:

a wire layer 22 formed in a first metal layer, the wire layer including a first electrode contacting line 19;

a bottom electrode 30 formed in a second metal layer;

a top electrode 34 formed in a third metal layer, the top electrode disposed over the bottom electrode;

a dielectric layer 32 separating the bottom electrode from the top electrode;

a contact formed between the first electrode contacting line 19 and a bottom side of the top electrode; and

a second contact 40 located on a top side of the bottom electrode 30.

Regarding claim 9, Merchant teaches that the top electrode 34 couples to the first electrode contacting line 19 through a hole in the dielectric 32. Regarding claims 11 and 13, the wire layer comprises a second electrode contacting line 18, which is coupled to a bottom surface of the bottom electrode 30 through a contact hole in an insulation layer 28. Regarding claims 14-

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16, Merchant teaches that the first and second electrode contacting lines 18 and 19 have planarized top surfaces (col. 4, lines 18-21) and are formed by a damascene process (col. 3, lines 52-56). Regarding claim 17, this is a processing limitation that does not structurally distinguish over Merchant. Regarding claim 19, the second contact 40 extends away from the substrate farther than the third metal layer (34).

7. Claims 20 and 24-28 are rejected under 35 U.S.C. 102(e) as being anticipated by 2005/0063135 to Borland et al. (hereinafter "Borland"). Borland teaches in figure 2B a capacitor comprising:

- a first metal layer including a bottom electrode 220 and an electrode contacting line 226;
- a top electrode 210 formed in a second metal layer, the top electrode disposed over the bottom electrode;
- dielectric layer 230 separating the bottom electrode from the top electrode;
- a contact formed between the electrode contacting line and a bottom side of the top electrode (see para. 0033, second to last sentence); and
- a second contact 1001 located on a top side of the bottom electrode 220.

Regarding claim 24, Borland teaches the second contact extends away from the substrate farther than the second layer. Regarding claim 25, Borland teaches that the bottom electrode and contact line have planarized (flat) surfaces (fig 2B). Regarding claims 26-28, these are processing limitations which do not distinguish structurally over Borland.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of Fujisawa, Chen and Merchant as applied above in view of US 6,800,923 to Yamamoto.

Fujisawa, Chen and Merchant taught the devices of claims 1 and 8 but did not expressly teach a plurality of separate contact holes. Yamamoto teaches, with reference to figure 1, an electrode 6 and a wiring layer 14 which are connected by a plurality of contact holes 12. Any of Fujisawa, Chen and Merchant are combinable with Yamamoto because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form a capacitor device with a plurality of contact holes as taught by Yamamoto.

The motivation for doing so, as is taught by Yamamoto, is that a greater number of holes allows for rapid charging/discharging of the capacitor (col. 5, lines 5-12). Therefore, it would have been obvious to combine any of Fujisawa, Chen and Merchant with Yamamoto to obtain the invention of claims 5 and 10.

***Allowable Subject Matter***

9. Claims 12, 21 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.



*Response to Arguments*

10. Applicant's arguments with respect to claims 1, 8 and 20 have been considered but are moot in view of the new grounds of rejection.


*Conclusion*

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional citations teach various capacitor structures having contacts for both the upper and lower electrodes in a variety of configurations.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (571) 272-1728.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
GEORGE ECKERT  
PRIMARY EXAMINER